CLAIMS

1. A polymeric article, comprising:

a particle comprising a polymer, the polymer comprising an iptycene moiety.

2. The polymeric article of claim 1, wherein the iptycene moiety comprises at least three arene planes.

3. The polymeric article of claim 2, wherein the iptycene moiety comprises at least five arene planes.

4. The polymeric article of claim 1, wherein the iptycene moiety is at least a portion of a repeat unit of the polymer.

5. The polymeric article of claim 1, wherein the polymer comprises a backbone.

6. The polymeric article of claim 5, wherein the backbone comprises a delocalized π-electron bond.

7. The polymeric article of claim 5, wherein the backbone comprises a benzene ring.

8. The polymeric article of claim 7, wherein the benzene ring is at least a portion of a repeat unit of the backbone of the polymer.

9. The polymeric article of claim 7, wherein a pendant group is attached to the backbone via the benzene ring.

10. The polymeric article of claim 5, wherein the backbone comprises a triple bond.

11. The polymeric article of claim 10, wherein the triple bond is at least a portion of a repeat unit of the polymer.

12. The polymeric article of claim 1, wherein the particle comprises a chromophore.

13. The polymeric article of claim 1, wherein the polymer comprises a chromophore.

14. The polymeric article of claim 1, wherein the polymer is a copolymer.

15. The polymeric article of claim 1, wherein the polymer comprises at least one pendant group.

16. The polymeric article of claim 15, wherein the pendant group comprises an aliphatic chain.

17. The polymeric article of claim 15, wherein the pendant group comprises an ether chain.

18. The polymeric article of claim 1, wherein the polymer comprises a charged moiety.

19. The polymeric article of claim 18, wherein the charged moiety comprises a sulfate.

20. The polymeric article of claim 18, wherein the charged moiety comprises an amine.

21. The polymeric article of claim 18, wherein the charged moiety is located on a pendant group.

22. The polymeric article of claim 1, wherein the polymer is amphiphilic.

23. The polymeric article of claim 1, wherein the polymer is anionic.

24. The polymeric article of claim 1, wherein the polymer is cationic.

25. The polymeric article of claim 1, wherein the polymer is amphoteric.

26. The polymeric article of claim 1, wherein the particle has a largest dimension no greater than about 10 μm.

27. The polymeric article of claim 26, wherein the particle has a largest dimension no greater than about 0.45 μm.

28. The polymeric article of claim 27, wherein the particle has a largest dimension no greater than about 100 nm.

29. The polymeric article of claim 28, wherein the particle has a largest dimension no greater than about 7 nm.

30. The polymeric article of claim 1, wherein the polymer has a largest dimension no greater than about 10 μm.

31. The polymeric article of claim 30, wherein the polymer has a largest dimension no greater than about 0.45 μm.

32. The polymeric article of claim 31, wherein the polymer has a largest dimension no greater than about 100 nm.

33. The polymeric article of claim 32, wherein the polymer has a largest dimension no greater than about 7 nm.

34. The polymeric article of claim 1, wherein the particle is able to be dispersed in an aqueous solution.

35. The polymeric article of claim 34, wherein the particle is able to remain dispersed in aqueous solution for at least about one month.

36. The polymeric article of claim 35, wherein the particle is able to remain dispersed in aqueous solution for at least about three months.

37. The polymeric article of claim 1, wherein the particle is formed by solvent inversion.

38. The polymeric article of claim 1, wherein the particle comprises a semiconductor material.

39. The polymeric article of claim 38, wherein the semiconductor material is silica.

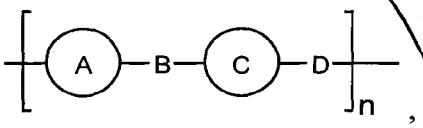
40. The polymeric article of claim 38, wherein the semiconductor material is covalently bound to the polymer.

41. The polymeric article of claim 1, wherein the particle comprises an entity able to specifically bind to a biological, biochemical, or chemical molecule.

42. The polymeric article of claim 41, wherein the entity is covalently bound to the polymer.

43. A polymeric article, comprising:

a particle comprising a polymer, the polymer comprising a structure:



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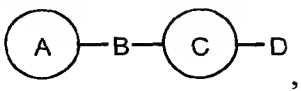
wherein n is at least 1, at least one of A and C comprises a bicyclic ring system, and at least one of B and D comprises a triple bond.

44. A polymeric article, comprising:

a particle comprising a copolymer formed from a plurality of monomers, wherein at least one monomer comprises a structure:



,

wherein at least one of A and C comprises a bicyclic ring system, and at least one of B and D comprises a triple bond.

45. A polymeric article, comprising:

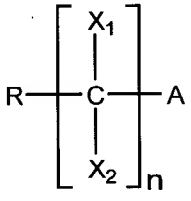
a particle comprising a polymer, wherein the polymer comprises an energy migration pathway and a chromophore.

46. A polymeric article, comprising:

a particle comprising a luminescent polymer, wherein the luminescent polymer comprises a plurality of triple bonds.

47. A polymeric article, comprising:

a particle comprising a luminescent polymer, the luminescent polymer comprising a structure:



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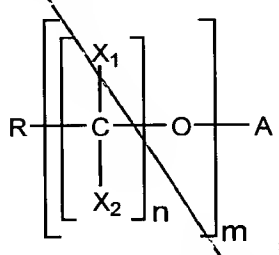
wherein n is at least 3, R is a covalent bond, X_1 and X_2 each comprise one of a hydrogen atom or a halogen atom, and A comprises an atom.

48. A polymeric article, comprising:

a particle comprising a luminescent polymer, the luminescent polymer comprising a structure:



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wherein n is at least 2, m is at least 2, R is a covalent bond, X_1 and X_2 each comprise one of a hydrogen atom or a halogen atom, and A comprises an atom.

49. A polymeric article, comprising:

a particle comprising a polymer, the polymer comprising a conjugated π-backbone chain, the π-backbone chain comprising a plane of atoms, the polymer having a first group and a second group attached to the π-backbone chain, the first group having a first fixed height above the plane of atoms and the second group having a second fixed height below the plane of atoms, wherein a sum of the first fixed height and second fixed height is at least about 0.45 nanometers.

50. A dispersion, comprising:

a polymer comprising an iptycene moiety, wherein the polymer is dispersed in a medium.

51. The dispersion of claim 50, wherein the medium is a fluid.

52. The dispersion of claim 51, wherein the fluid is water.

53. The dispersion of claim 50, wherein the medium is a gel.

54. The dispersion of claim 50, wherein the medium is a polymer.

55. The dispersion of claim 54, wherein the polymer is optically clear.

56 The dispersion of claim 50, wherein the medium is a glass.

57. The dispersion of claim 50, wherein the iptycene moiety comprises at least three arene planes.

58. The dispersion of claim 57, wherein the iptycene moiety comprises at least five arene planes.

59. The dispersion of claim 58, wherein the iptycene moiety is at least a portion of a repeat unit of the polymer.

60. The dispersion of claim 50, wherein the polymer comprises a backbone.

61. The dispersion of claim 60, wherein the backbone comprises a delocalized π-electron bond.

62. The dispersion of claim 60, wherein the backbone comprises a benzene ring.

63. The dispersion of claim 62, wherein the benzene ring is at least a portion of a repeat unit of the backbone of the polymer.

64. The dispersion of claim 62, wherein a pendant group is attached to the backbone via the benzene ring.

65. The dispersion of claim 60, wherein the backbone comprises a triple bond.

66. The dispersion of claim 65, wherein the triple bond is at least a portion of a repeat unit of the polymer.

67. The dispersion of claim 50, wherein the polymer comprises a chromophore.

68. The dispersion of claim 50, wherein the polymer is a copolymer.

69. The dispersion of claim 50, wherein the polymer comprises at least one pendant group.

70. The dispersion of claim 69, wherein the pendant group comprises an aliphatic chain.

71. The dispersion of claim 69, wherein the pendant group comprises an ether chain.

72. The dispersion of claim 50, wherein the polymer comprises a charged moiety.

73. The dispersion of claim 72, wherein the charged moiety comprises a sulfate.

74. The dispersion of claim 72, wherein the charged moiety comprises an amine.

75. The dispersion of claim 72, wherein the charged moiety is located on a pendant group.

76. The dispersion of claim 50, wherein the polymer is amphiphilic.

77. The dispersion of claim 50, wherein the polymer is anionic.

78. The dispersion of claim 50, wherein the polymer is cationic.

79. The dispersion of claim 50, wherein the polymer is amphoteric.

80. The dispersion of claim 50, wherein the polymer has a largest dimension no greater than about 10 μm.

81. The dispersion of claim 80, wherein the polymer has a largest dimension no greater than about 0.45 μm.

82. The dispersion of claim 81, wherein the polymer has a largest dimension no greater than about 100 nm.

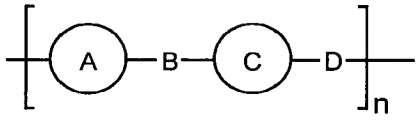
83. The dispersion of claim 82, wherein the polymer has a largest dimension no greater than about 7 nm.

84. The dispersion of claim 50, wherein an entity is covalently attached to the polymer, the entity able to specifically bind to a biological, biochemical, or chemical molecule.

85. The dispersion of claim 50, wherein the polymer is a copolymer.

86. A dispersion, comprising:

a polymer dispersed in a medium, the polymer comprising a structure:

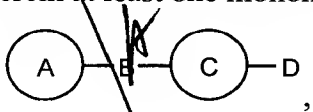


,

wherein n is at least 1, at least one of A and C comprises a bicyclic ring system, and at least one of B and D comprises a triple bond.

87. A dispersion, comprising:

a copolymer dispersed in a medium, the copolymer formed from a plurality of monomers, wherein at least one monomer comprises a structure:



,

wherein at least one of A and C comprises a bicyclic ring system, and at least one of B and D comprises a triple bond.

88. A method of amplifying an emission, comprising:

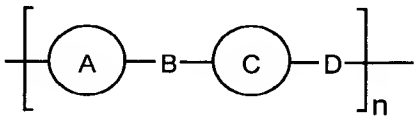
providing a particle comprising a polymer, the polymer comprising an energy migration pathway and a chromophore;

exposing the particle to a source of energy to form an excitation energy; and

allowing the excitation energy to travel through the migration pathway and to transfer to the chromophore, causing an emission that is greater than an emission resulting from a polymer free of an energy migration pathway.

89. A method of detecting an analyte, comprising:

providing a particle comprising a polymer, the polymer comprising a structure:



,

wherein n is at least 1, at least one of A and C comprises a bicyclic ring system, and at least one of B and D comprises a triple bond;

exposing the particle to a source of energy to cause an emission of radiation;

exposing the particle to a medium suspected of containing an analyte able to cause a change in the emission of radiation; and

detecting the presence of the analyte by detecting the change in emission of radiation.

90. The method of detecting an analyte of claim 89, wherein the energy is selected from the group consisting of electromagnetic radiation, electrical energy, sound energy, thermal energy, and chemical energy.

91. The method of detecting an analyte of claim 89, wherein the change in emission of radiation is caused by a change in conformation of the polymer.

92. The method of detecting an analyte of claim 89, wherein the bicyclic ring system comprises an iptycene moiety.

93. The method of detecting an analyte of claim 89, wherein at least two of A, B, C, and D are in π-electron communication.

94. The method of detecting an analyte of claim 89, wherein the particle is dispersed in an aqueous solution.

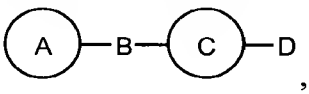
95. The method of detecting an analyte of claim 89, wherein the particle has a largest dimension no greater than about 7 nm.

96. The method of detecting an analyte of claim 89, wherein the particle comprises a semiconductor material.

97. The method of detecting an analyte of claim 89, wherein the particle comprises an entity able to specifically bind to a biological, biochemical, or chemical molecule.

98. A method of detecting an analyte, comprising:

providing a particle comprising a copolymer formed from a plurality of monomers, wherein at least one monomer comprises a structure:



,

wherein at least one of A and C comprises a bicyclic ring system, and at least one of B and D comprises a triple bond;

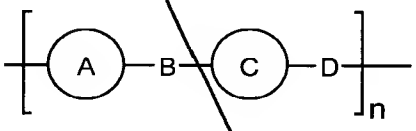
exposing the particle to a source of energy to cause an emission of radiation;

exposing the particle to a medium suspected of containing an analyte able to cause a change in the emission of radiation; and

detecting the presence of the analyte by detecting the change in emission of radiation.

99. A sensor, comprising:

a particle comprising a polymer having a structure:



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wherein n is at least 1, at least one of A and C comprises a bicyclic ring system, and at least one of B and D comprises a triple bond;

a source of energy applicable to the polymeric composition to cause emission of radiation; and

an emission detector positionable to detect the emission.

100. The sensor of claim 99, wherein the bicyclic ring system comprises an iptycene moiety.

101. The sensor of claim 100, wherein the iptycene moiety comprises at least five arene planes.

102. The sensor of claim 99, wherein at least two of A, B, C, and D are in π-electron communication.

103. The sensor of claim 99, wherein at least one of A and C comprises a benzene ring.

104. The sensor of claim 99, wherein the polymer comprises at least one pendant group.

105. The sensor of claim 104, wherein the pendant group comprises an aliphatic chain

106. The sensor of claim 104, wherein the pendant group comprises an ether chain.

107. The sensor of claim 99, wherein the polymer comprises a charged moiety.

108. The sensor of claim 107, wherein the charged moiety is located on a pendant group.

109. The sensor of claim 99, wherein the polymer is anionic.

110. The sensor of claim 99, wherein the polymer is cationic.

111. The sensor of claim 99, wherein the particle has a largest dimension no greater than about 0.45 μm.

112. The sensor of claim 111, wherein the particle has a largest dimension no greater than about 7 nm.

113. The sensor of claim 99, wherein the particle is dispersed in an aqueous solution.

114. The sensor of claim 99, wherein the particle is formed by solvent inversion.

115. The sensor of claim 99, wherein the particle comprises a semiconductor material.

116. The sensor of claim 115, wherein the semiconductor material is silica.

117. The sensor of claim 99, wherein the particle comprises an entity able to specifically bind to a biological, biochemical, or chemical molecule.

118. The sensor of claim 117, wherein the entity is covalently bound to the polymer.

119. The sensor of claim 99, wherein the polymer is a copolymer.

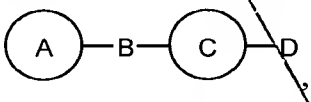
120. The sensor of claim 99, wherein n is at least about 100.

121. The sensor of claim 120, wherein n is at least about 1,000.

122. The sensor of claim 121, wherein n is at least about 10,000.

123. A sensor, comprising:

a particle comprising a copolymer formed from a plurality of monomers, wherein at least one monomer comprises a structure:



wherein at least one of A and C comprises a bicyclic ring system, and at least one of B and D comprises a triple bond;

a source of energy applicable to the polymeric composition to cause emission of radiation; and

an emission detector positionable to detect the emission.

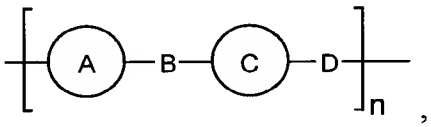
124. A method of making a polymeric article, comprising:

providing a particle comprising a polymer, the particle comprising an iptycene moiety; and

immobilizing a biological, biochemical, or chemical molecule onto the particle.

125. A method of making a polymeric article, comprising:

providing a particle comprising a polymer having a structure:



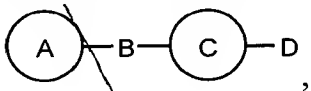
,

wherein n is at least 1, at least one of A and C comprises a bicyclic ring system, and at least one of B and D comprises a triple bond; and

immobilizing a biological, biochemical, or chemical molecule onto the particle.

126. A method of making a polymeric article, comprising:

providing a particle comprising a copolymer formed from a plurality of monomers, wherein at least one monomer comprises a structure:



,

wherein at least one of A and C comprises a bicyclic ring system, and at least one of B and D comprises a triple bond; and

immobilizing a biological, biochemical, or chemical molecule onto the particle.

127. A method of making a polymeric article, comprising:

providing a luminescent polymer molecule having a smallest dimension of no less than about 5 nanometers; and

immobilizing a biological, biochemical, or chemical molecule onto the particle.